



Sheet 2 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor
2/69

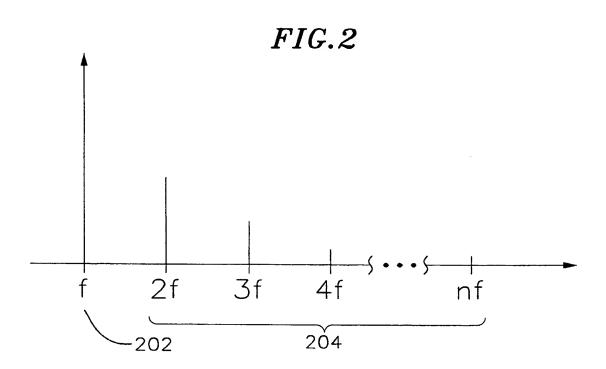
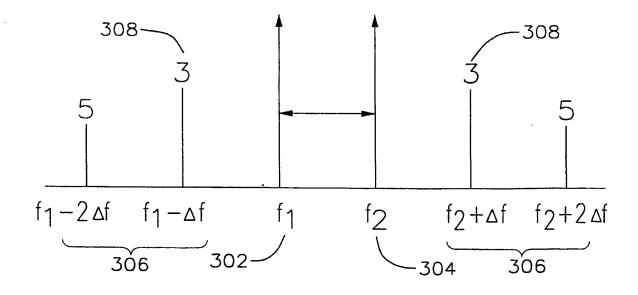
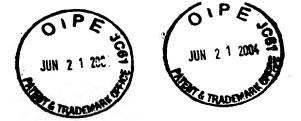


FIG.3
PRIOR ART





Sheet 3 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

3/69

FIG.4 PRIOR ART

AMPLITUDE

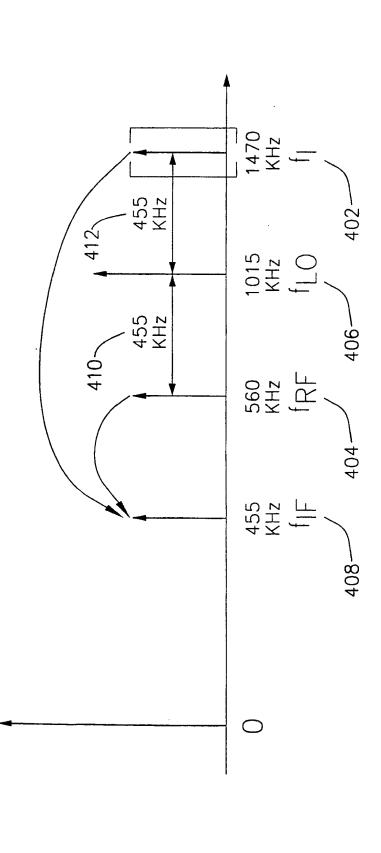
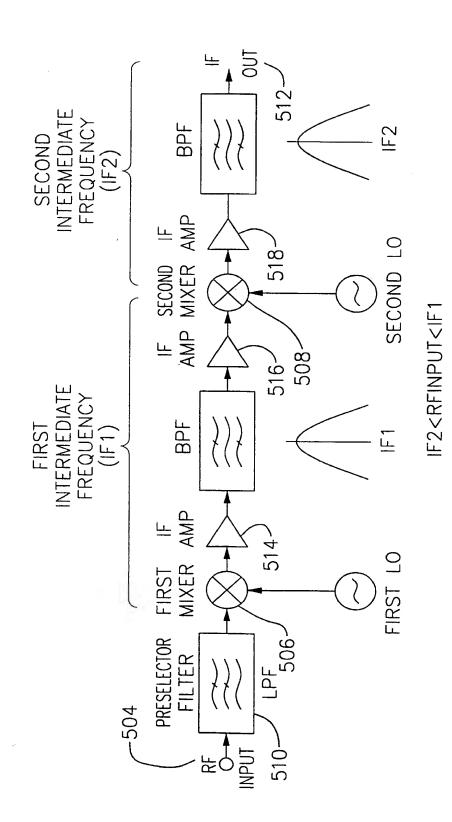


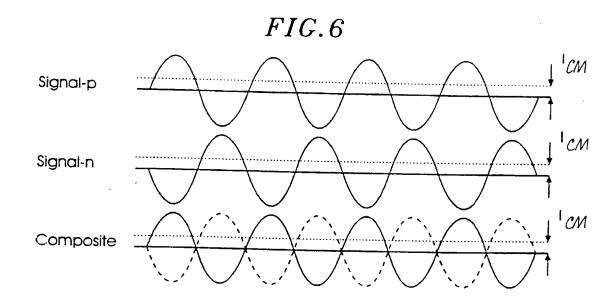


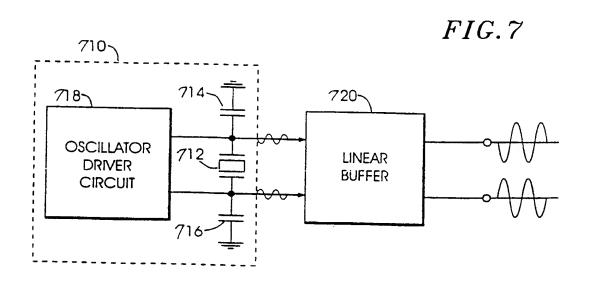
FIG.5Dual conversion receiver



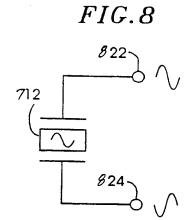


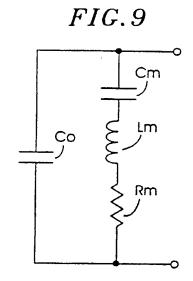
Sheet 5 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

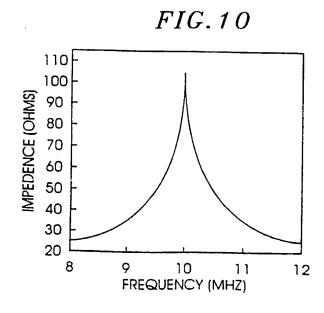


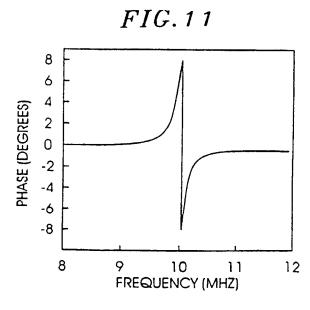


Sheet 6 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor



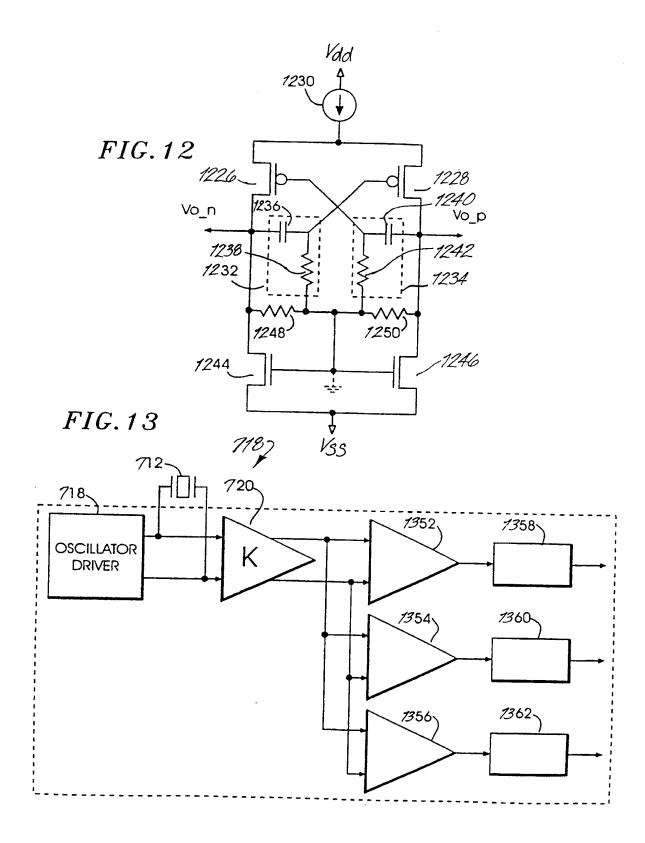






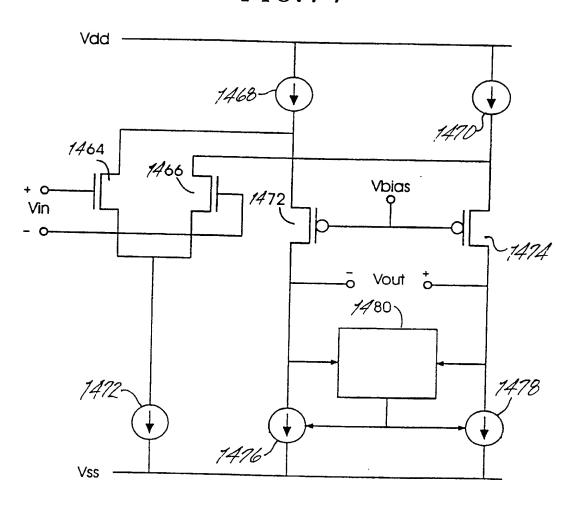


Sheet 7 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor
7/69

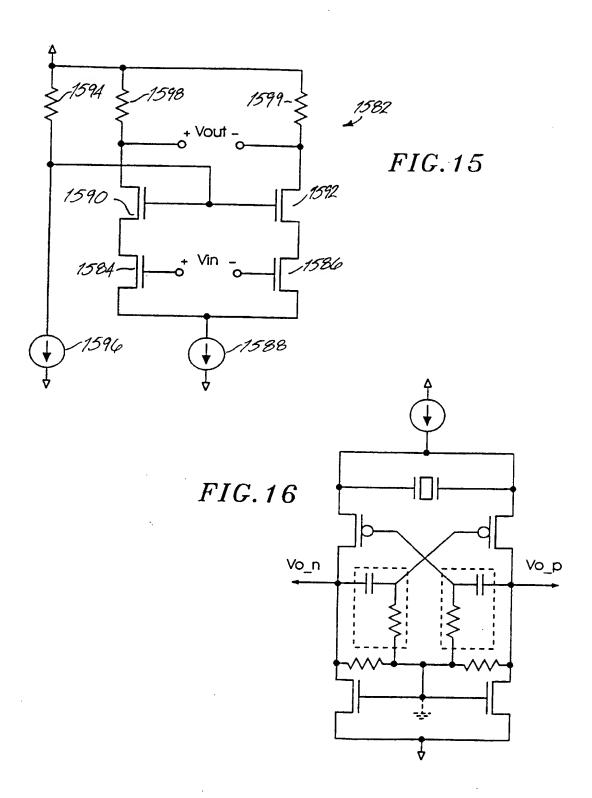


Sheet 8 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

FIG. 14



Sheet 9 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor





Sheet 10 of 69

Appl. No. 09/493,942; Filed: Jan 28, 2000

Dkt No. 1875.1380006; Group Unit: 2832

Inventor: James Y.C. Chang Tel: 202-371-2600

Title: Multi-Track Integrated Spiral Inductor

10/69

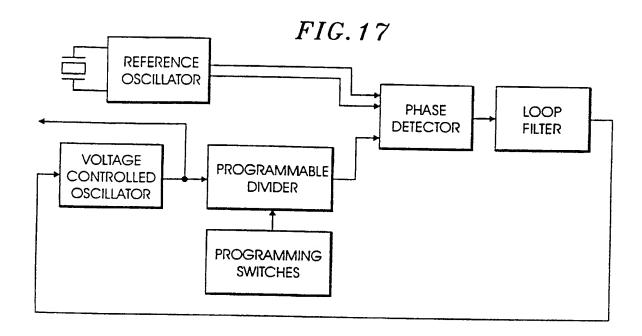


FIG. 18

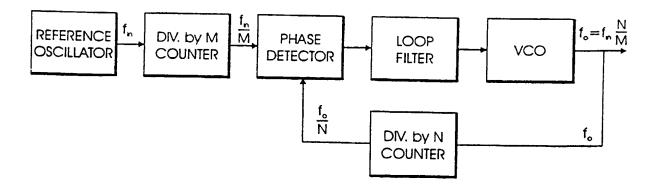
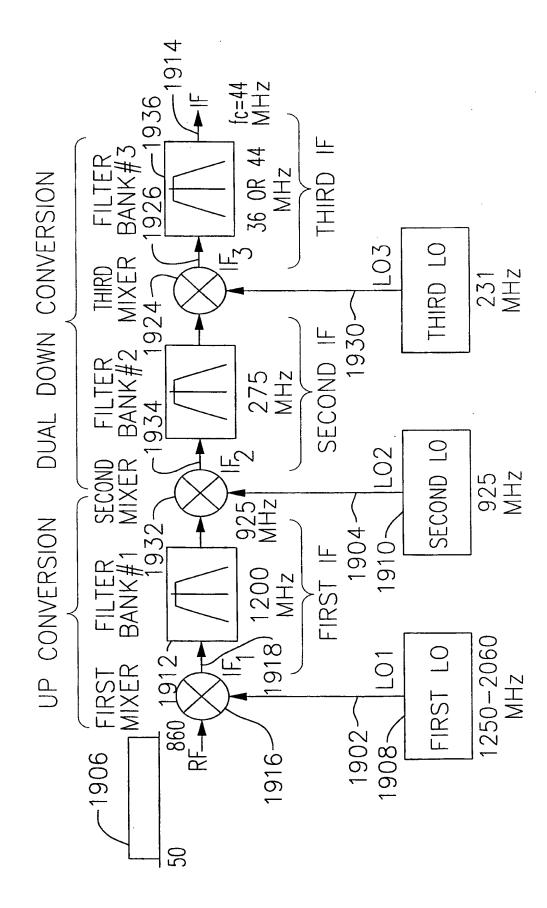




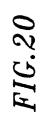


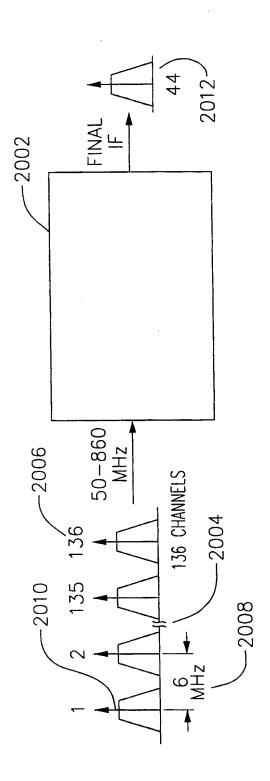
FIG. 19





Sheet 12 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor







Sheet 13 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor
13/69

FIG. 21

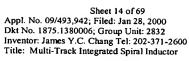
PPL Xtol REFERENCE=10MHz
LO-1, 10MHz FREQUENCY STEPS
LO-2, 100KHz FREQUENCY STEPS
TABLE OF FREQUENCIES BASED ON
COARSE/FINE PLL SOLUTION:

44MHz IF

 $\frac{\text{NOTE}}{\text{LO}-2} \text{ REF} = 100 \text{KHz},$  SO DIVIDE RANGE=9216 TO 9280

Frf (MHz)	20	99	62	89	74	8	86	65	98	104	410	116		ì	=		
								;	3	2	2	2	155	87		824	98
LO-1(MHz)	1250	1260	1260	1970	1070	000	000		000,								
		_	1	12/0	16/0	1600	253	1290	1300	1300 1310	1310	1320	1320	1330	2	2050	2060
	-	_								-							
IF-1 (MHz)	1200	1204	1198	1202	1196	1200	1204	1198	1202	1196	1200	1204	1108	1202	=	7	100
										2	3	2	2	וכחכ		081-	1200
1 O 0/18/11/1	_		000														
LO-Z(INIPZ)	324.8	928.0	923.2	926.4	921.6	921.6 924.8 928.0 923.2 926.4	928.0	923.2	926.4	921.6 924.8 928.0	924.8	928.0	923.2	9264	=	921 6	0 700
											T					3	364.0
IE2/MH51	275.0		0740	075	, , ,												
(7)		7,0.0	6/4.0	0.0/2	2/4.4	275.2	276.0	274.8	275.6	2/3.0 2/4.4 275.2 276.0 274.8 275.6 274.4 275.2 276.0 274.8 275.6	275.2	276.0	274.8	275.6	=	274 4 275 9	275.9
											T						7.0.7
7 3/8/1-1	0.00	1	0000	18			1										
LO-3(111174)	531.2	727	230.8	232	230	231	232	231	232	230	231	232	23.4	222	=	000	3
							┰	1				*	3	202		230	53
	1	- 1									-						
1F-3(MHZ)	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	44.0	2	0 77	0	1		!	
							•	:	2	)  -		7.1	44.0	44	•	77	77

2117



14/69

JUN 2 1 2004

FIG.22

PPL Xtal REFERENCE=10MHz L0-1, 10MHz FREQUENCY STEPS L0-2, 100kHz FREQUENCY STEPS

TABLE OF FREQUENCIES BASED ON COARSE/FINE PLL SOLUTION:

36MHz IF

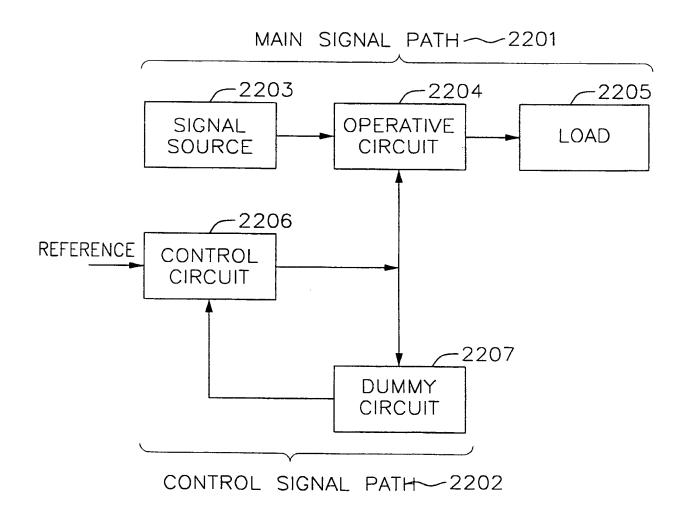
NOTE • LO-2 REF = 100KHz, SO DIVIDE RANGE = 9280 TO 9340

Frf (MHz)	20	28	99	74	82	96	88	106	114	122	130	138	146	154	=	RES	BEO
										1				ı		305	8
LO-1(MHz)	1250	1260	1270	1270	1280	1290	1300	1310	1310	1320	1330	1340	1350	1350	=	2050	2060
											1	1	1				
IF-1 (MHz)	1200	1202	1204	1196	1198	1200	1202	1204	1196	1198	1200	1202	1204	1196	=	1198	1200
																2	
LO-2(MHz)	931.2	932.8	934.4	928.0	930	931	933	934	928.0	930	931	933	934	928.0	=	929 60	931.2
													+-			200	321:5
IF-2(MHz)	268.8	269.2	269.6	268	.0 268.4 268.8	268.8	269.2	269.6	268.0 268.4	268.4	268.8	2692	269 6	268 O	=	7 8 A	0 030
																1,00.1	200.0
LO-3(MHz)	232.8	232.8 233.2	233.6	232	232	233	233	234	232	232	233	233	234	232.0	=	232.4	232 B
																	2
IF-3(MHz)	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	36.0	38.0	=	36.0	0 96

Sheet 15 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

15/69

### FIG.23







-UP/DOWN .2304 -2310 RESET LUNING 正 MHz REF 2312-9 925 MHz-7L0

FIG. 24α

Sheet 17 of 69

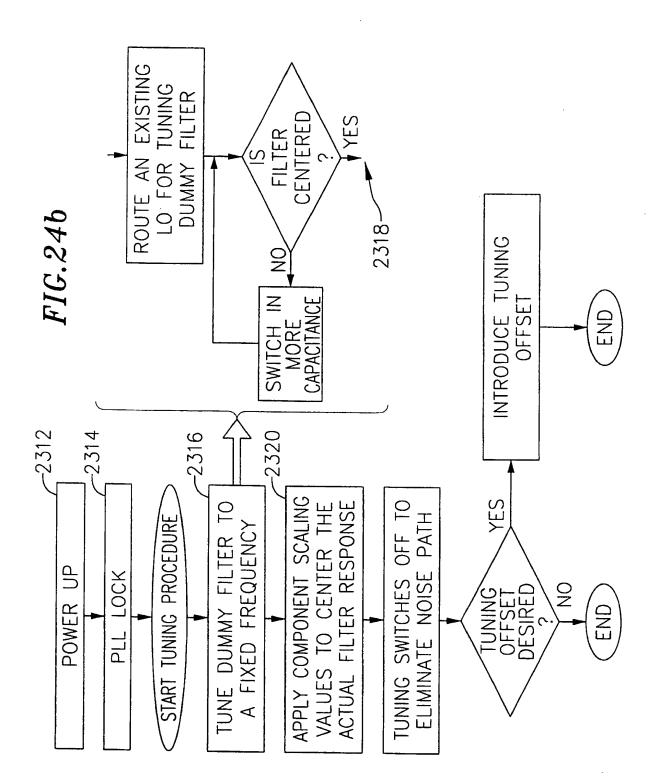
Appl. No. 09/493,942; Filed: Jan 28, 2000

Dkt No. 1875.1380006; Group Unit: 2832

Inventor: James Y.C. Chang Tel: 202-371-2600

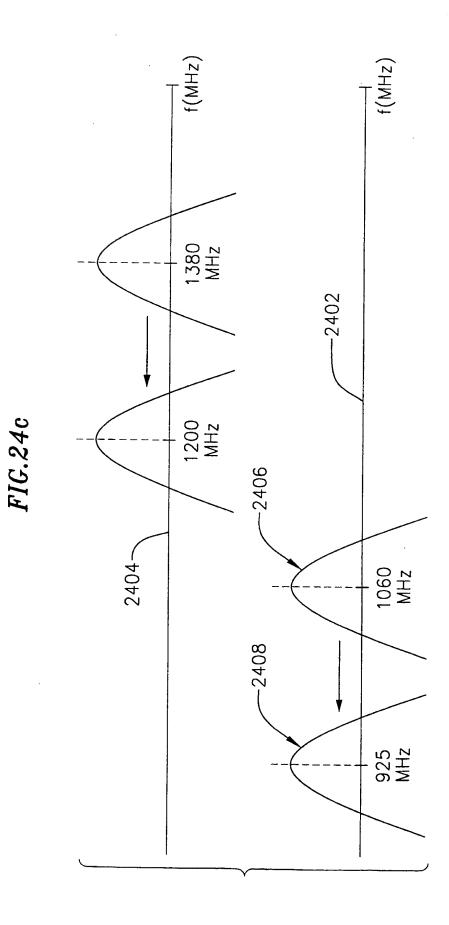
Title: Multi-Track Integrated Spiral Inductor

17/69









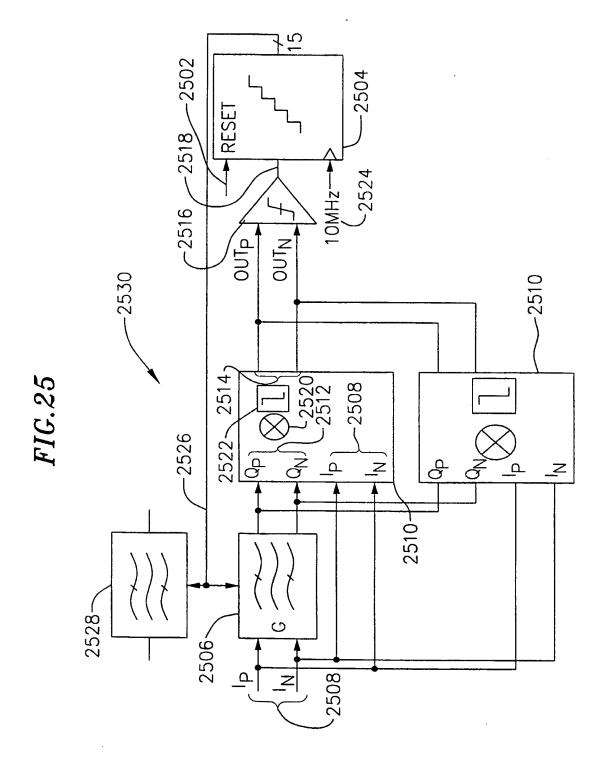
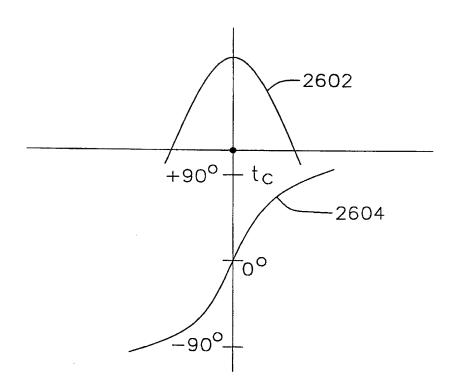




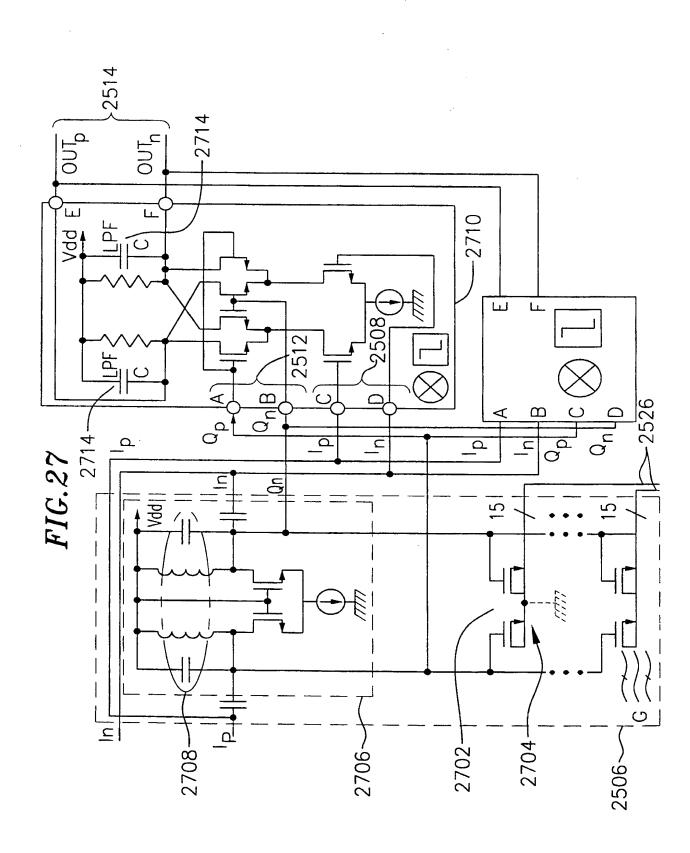


FIG.26





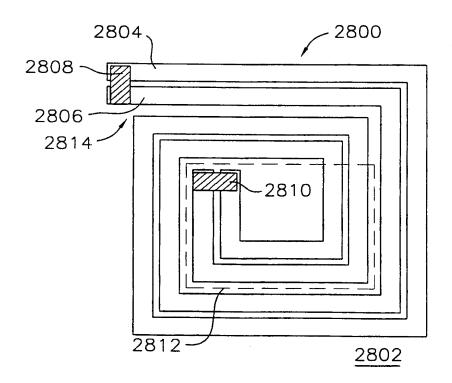




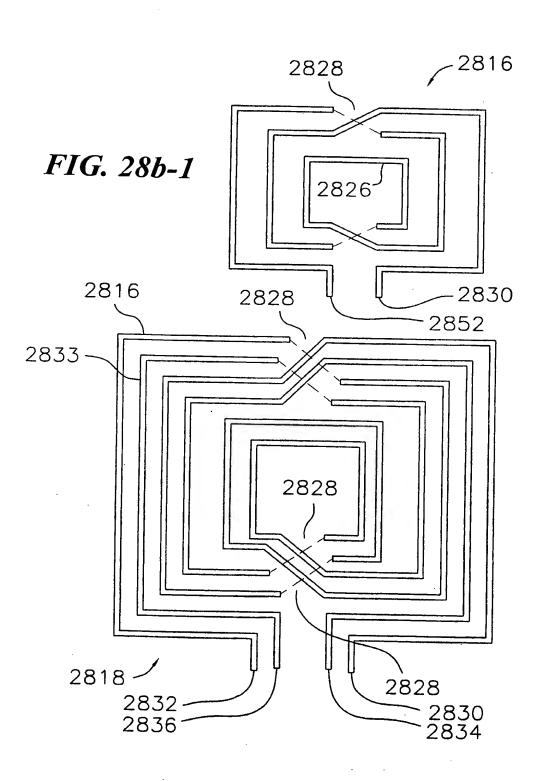




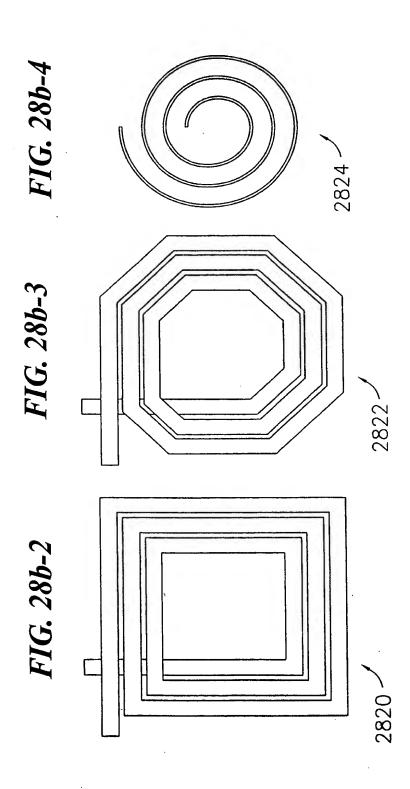
# $FIG.28\alpha$



Sheet 23 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor



Sheet 24 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor





25/69

## FIG. 28b-5

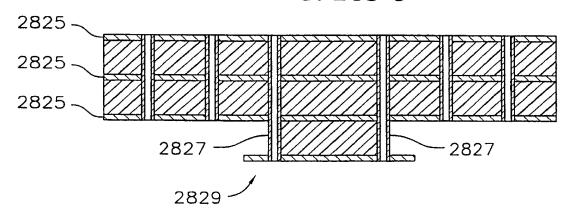
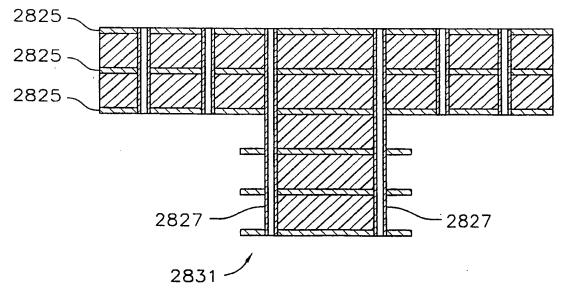


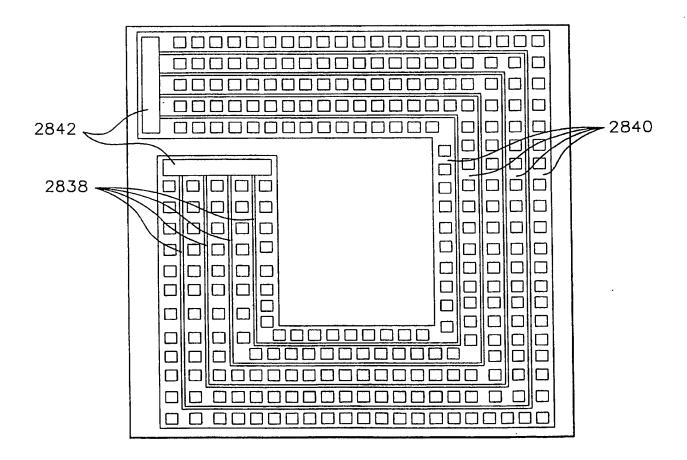
FIG. 28b-6



Sheet 26 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

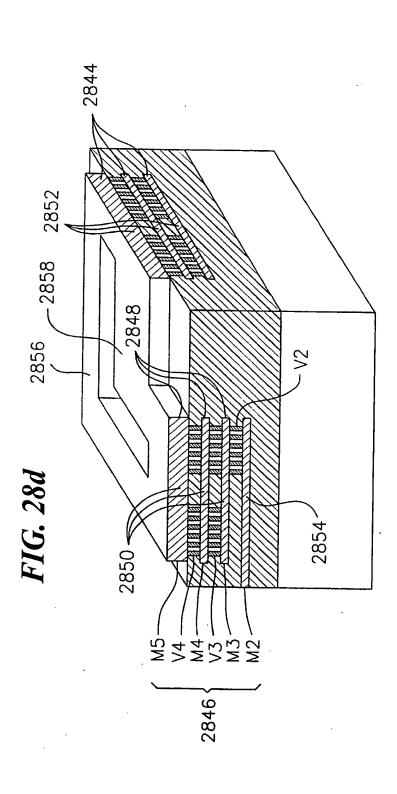
26/69

#### FIG. 28c











Sheet 28 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

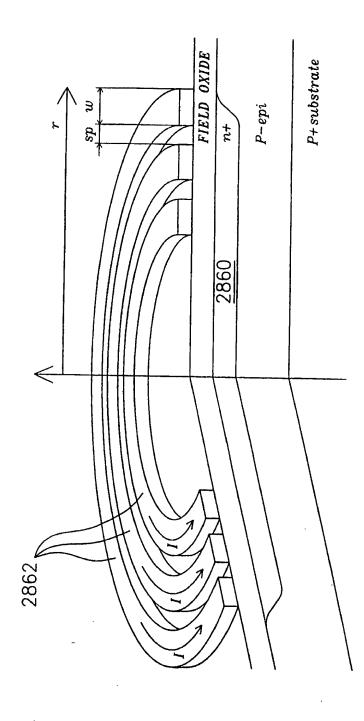
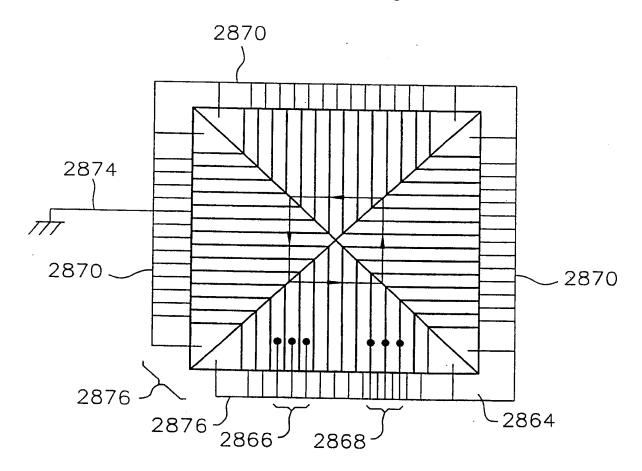


FIG. 28.



Sheet 29 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

FIG. 28f



Sheet 30 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

30/69

# FIG.29

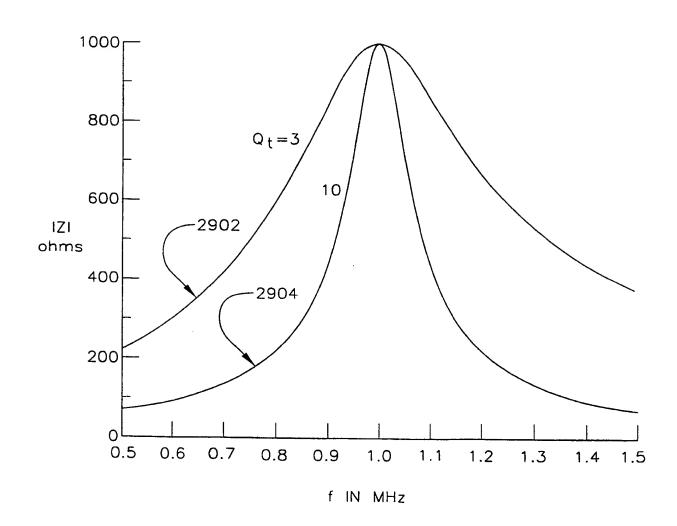




FIG.30

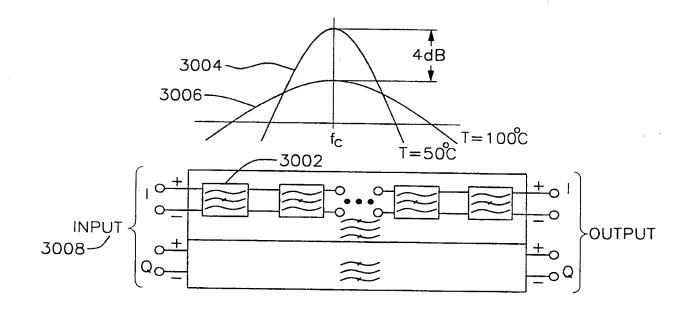
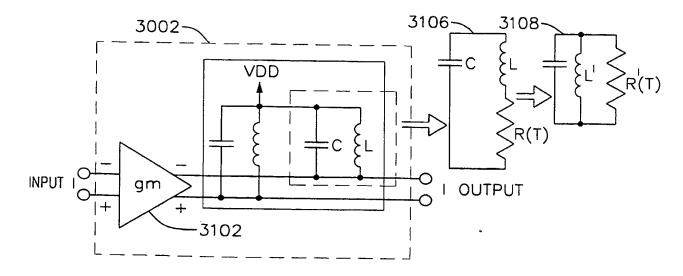
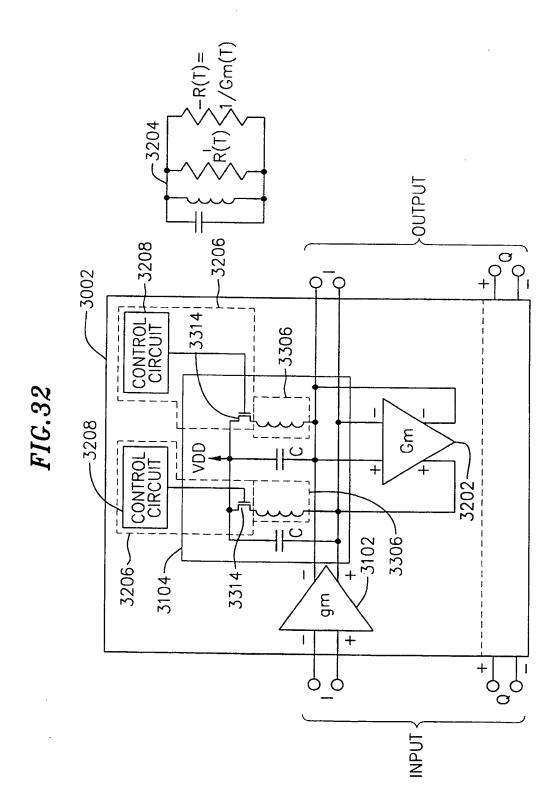


FIG.31



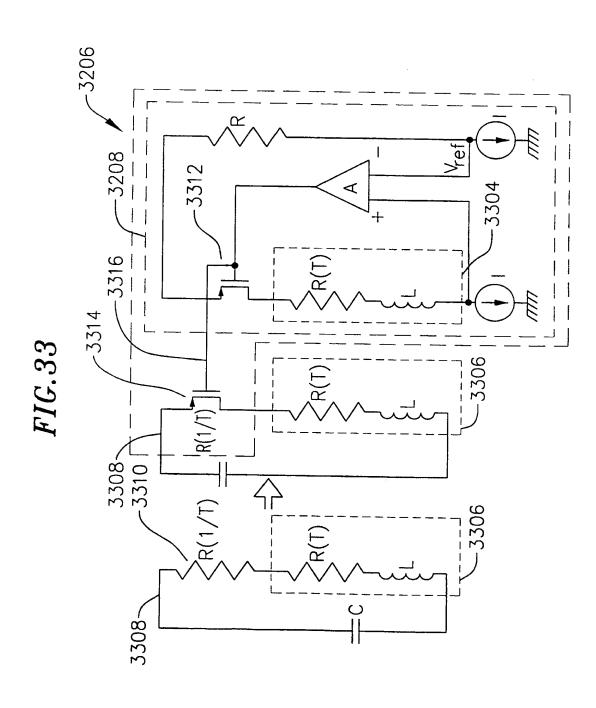


Sheet 32 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor









Sheet 34 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

34/69

#### FIG.34

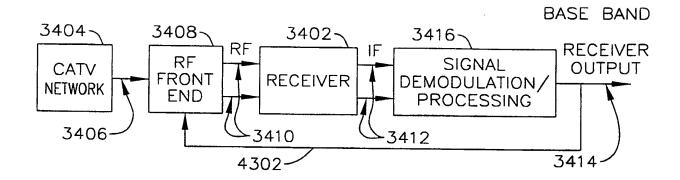
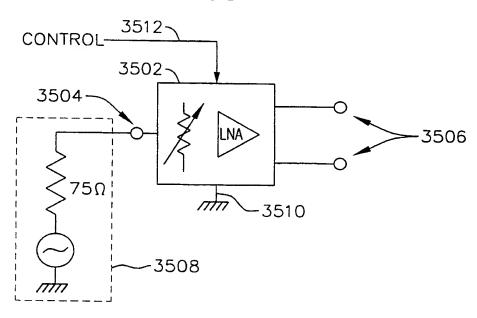
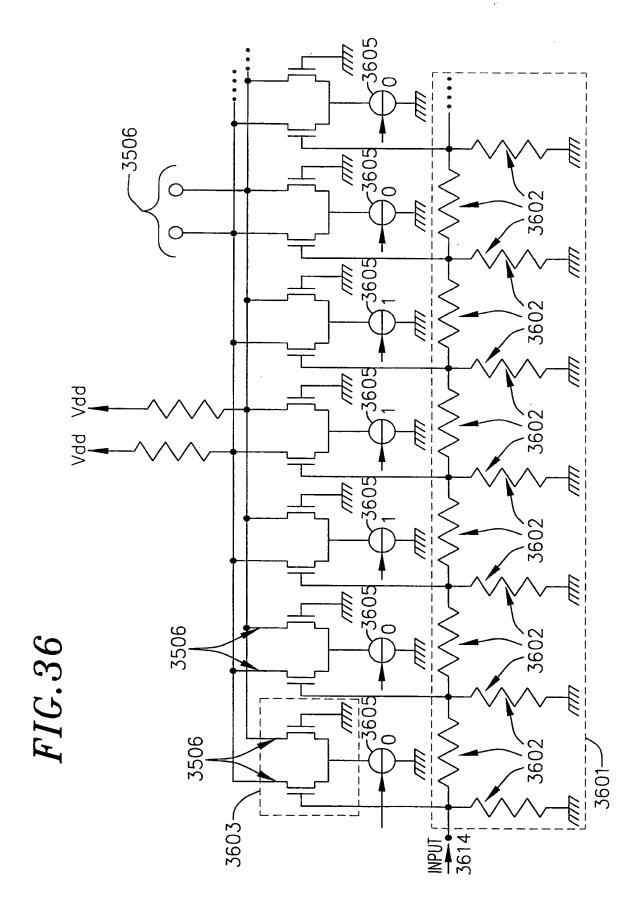


FIG.35



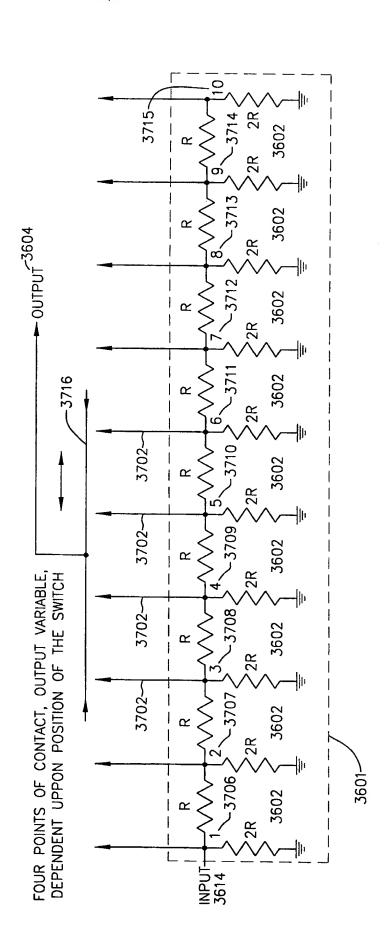






Sheet 36 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

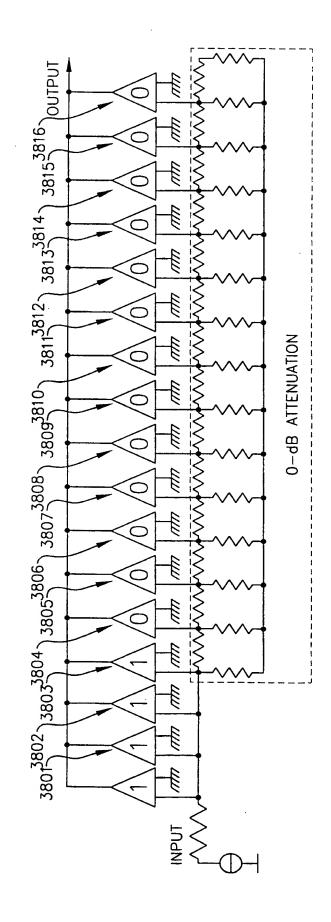




37/69

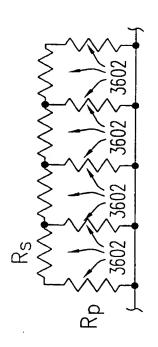
FIG.38

PGA SETTINGS









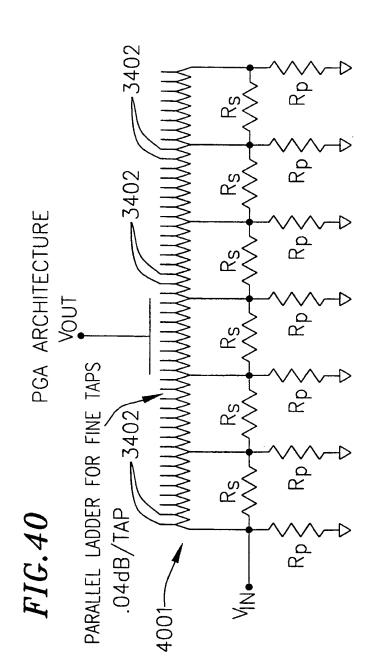






FIG.41

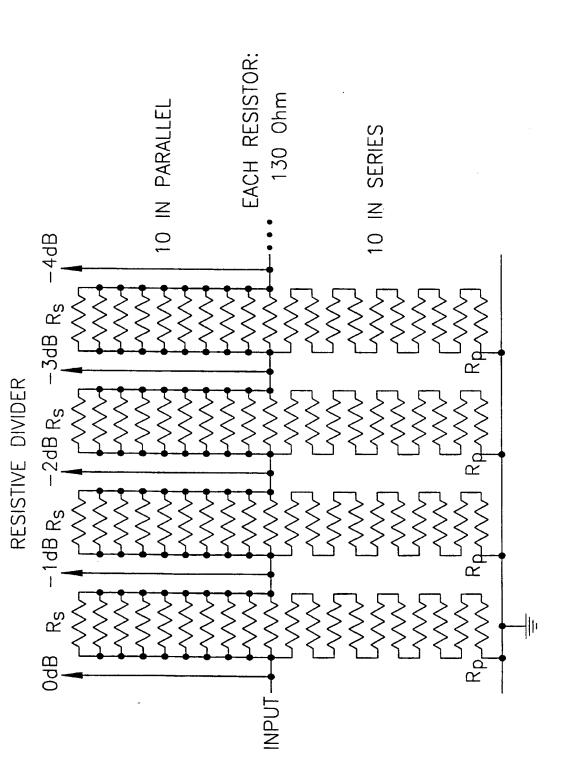
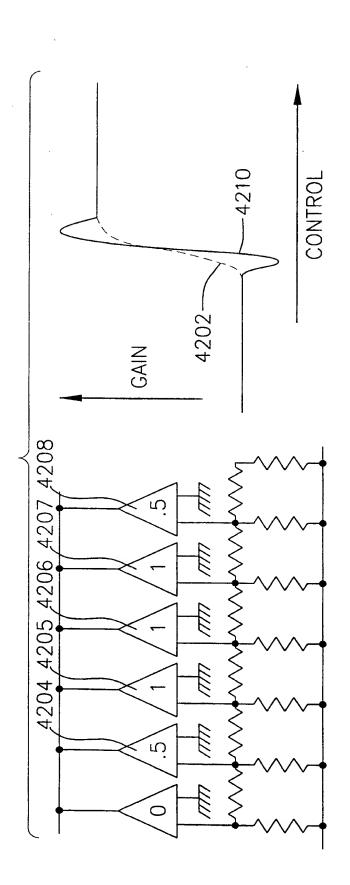






FIG. 42

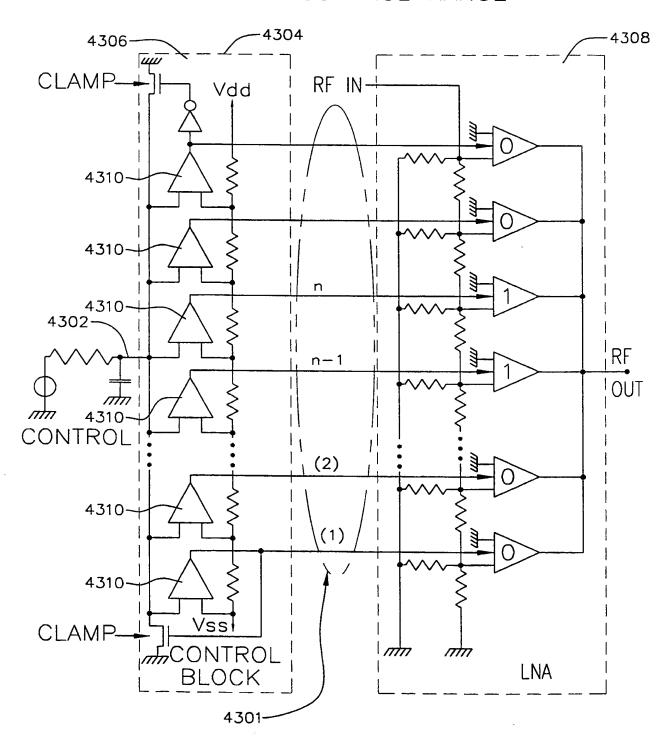
NON-MONOTONICITY





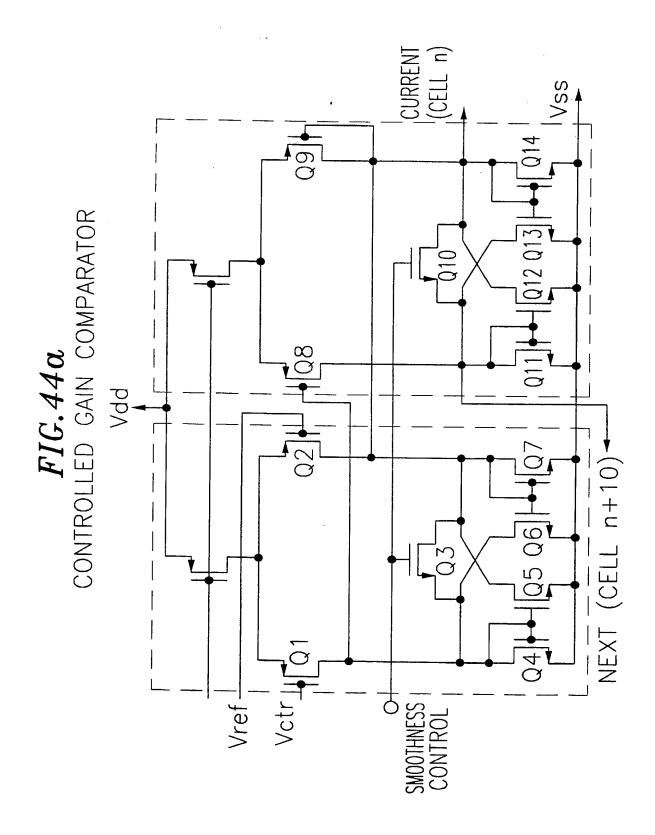
Sheet 41 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

FIG.43
CLAMPING CONTROL RANGE



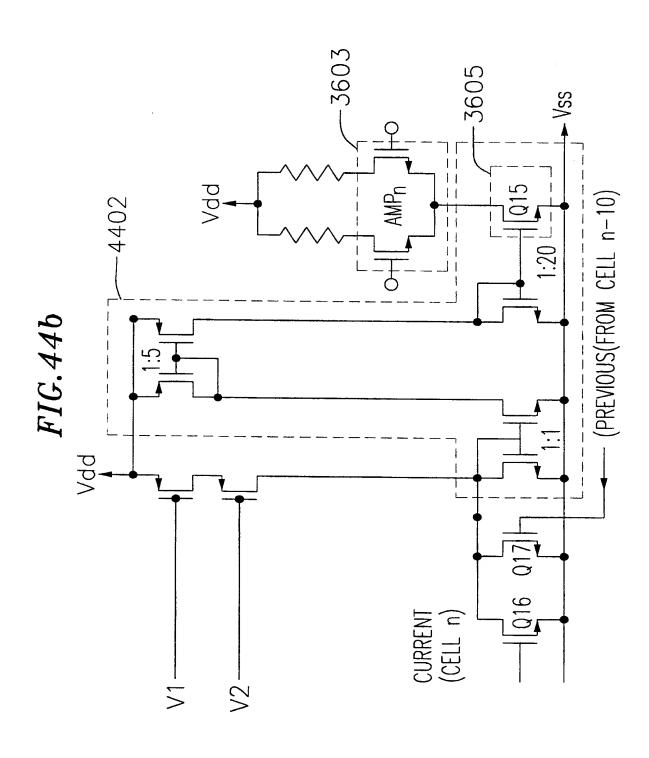








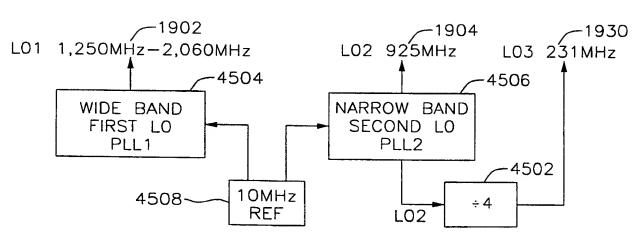






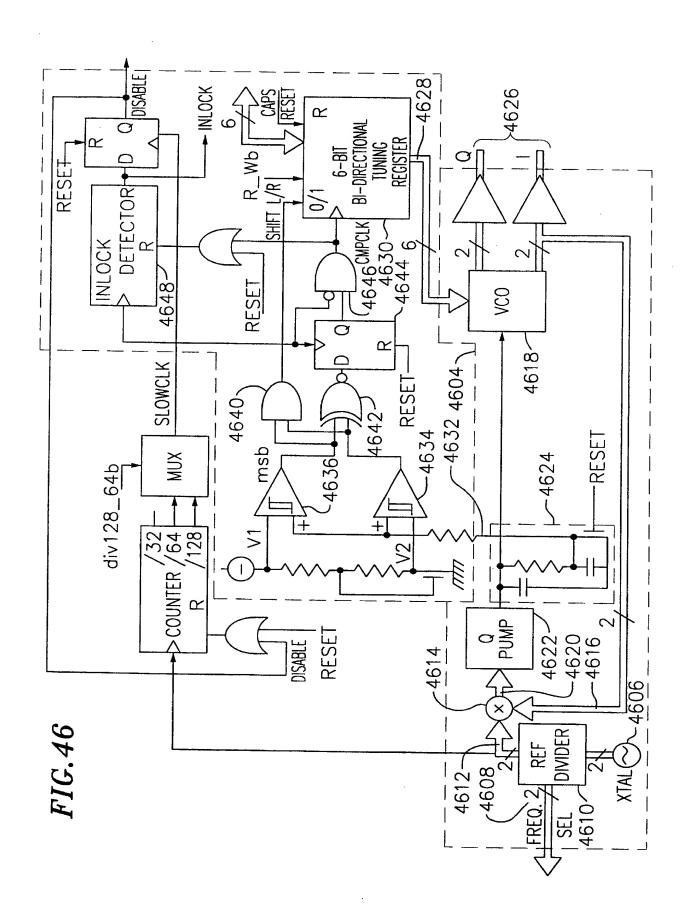
Sheet 44 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

44/69







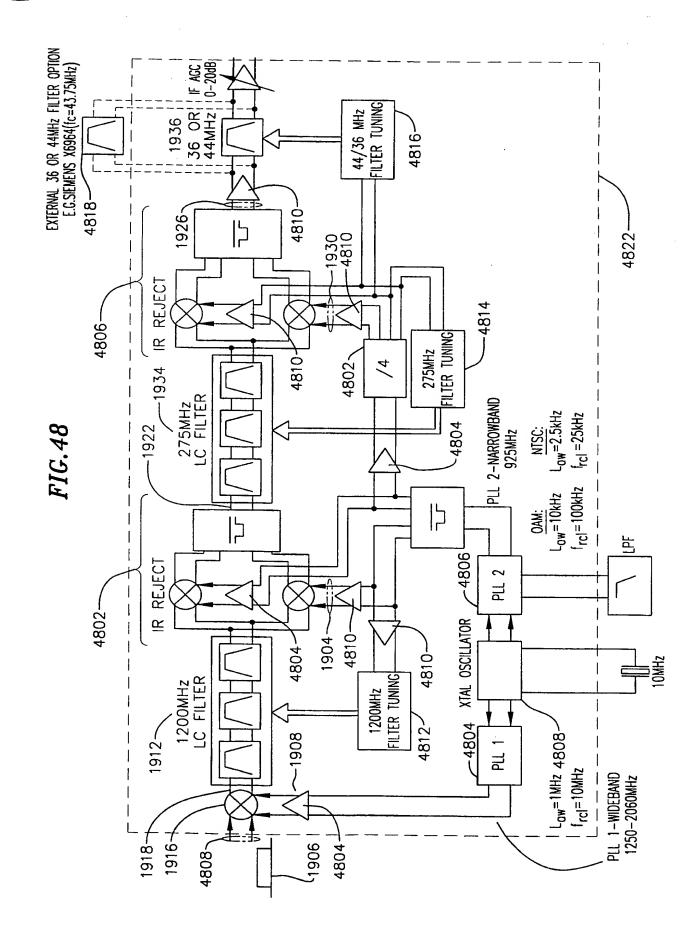






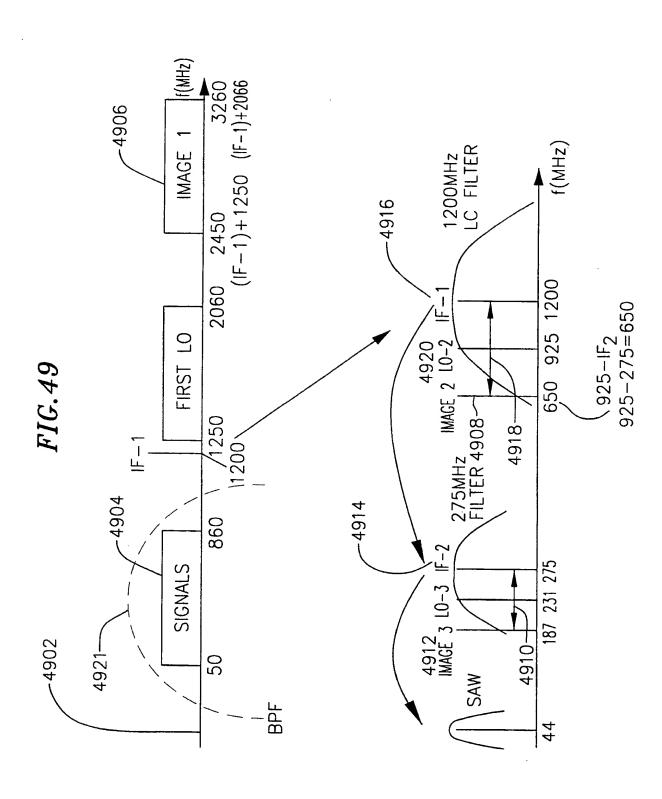
REMOVI CAPACI<sup>7</sup> -4706 9 4710 4708~ V2>CONTROL VOLTAGE>V1 -4702 9 YES V1<CONTROL VOLTAGE<V2 FIG. 47 START ۲. STOP DISABLE SHIFT REGISTER YES

Sheet 47 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor









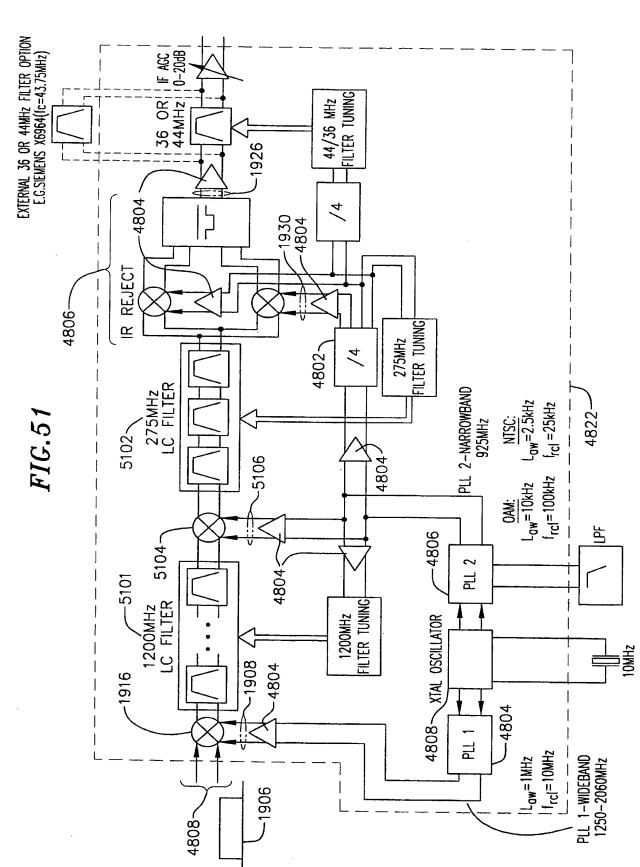




(fRF-fLO -4522 (fRF + fLOI) (TRF + 1/01 -4520 1RF-101 S S 'RF" -5002 FIG.505004— 4516— O 4514-PHASE SHIFT NETWORK 90 DEGREES -5006 90 DEGREES 5008 45127 R R

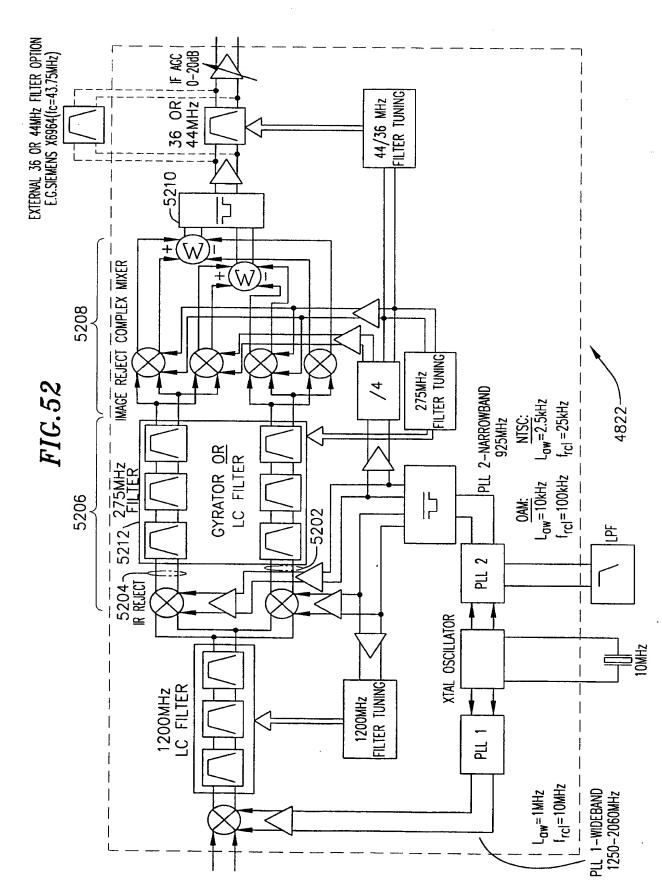






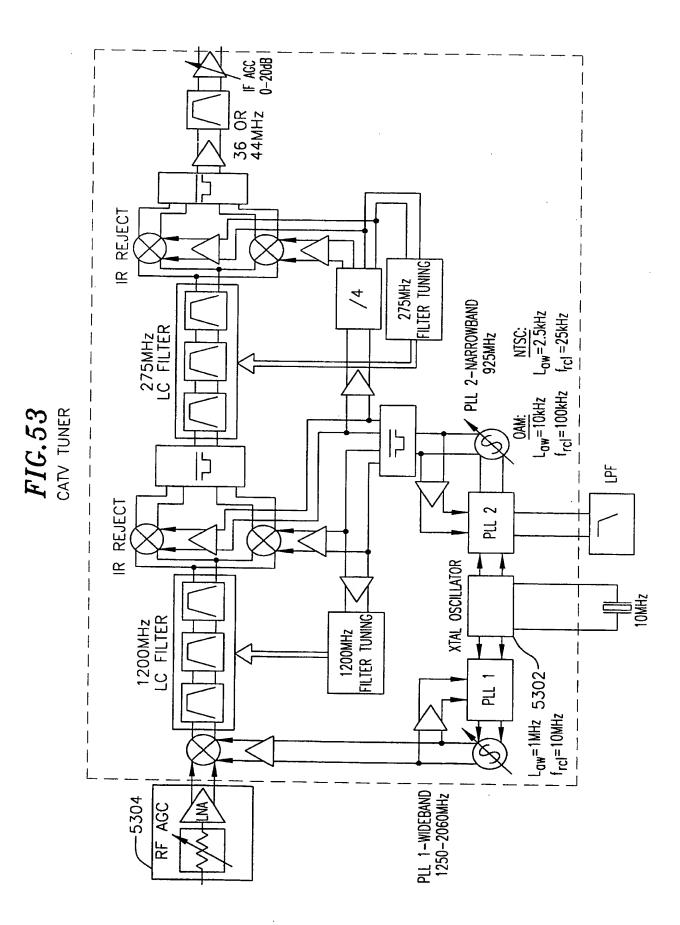








Sheet 52 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor







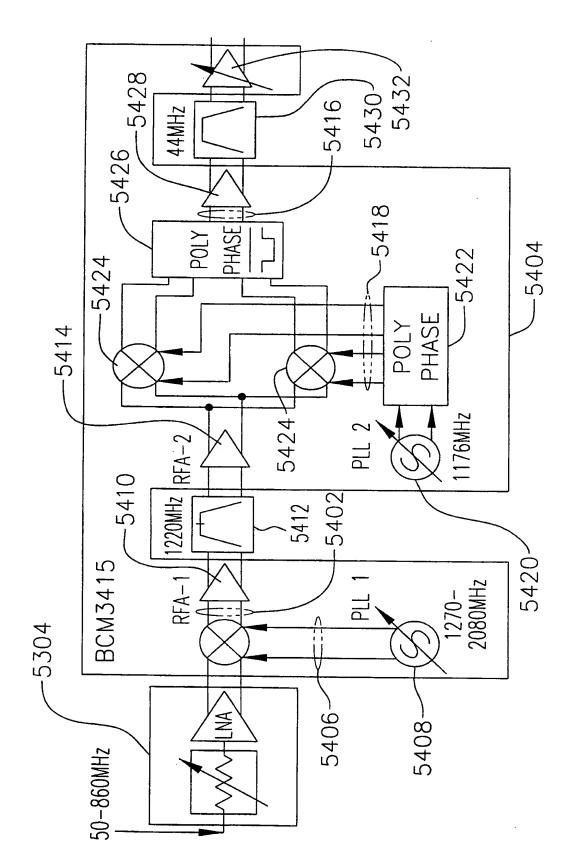
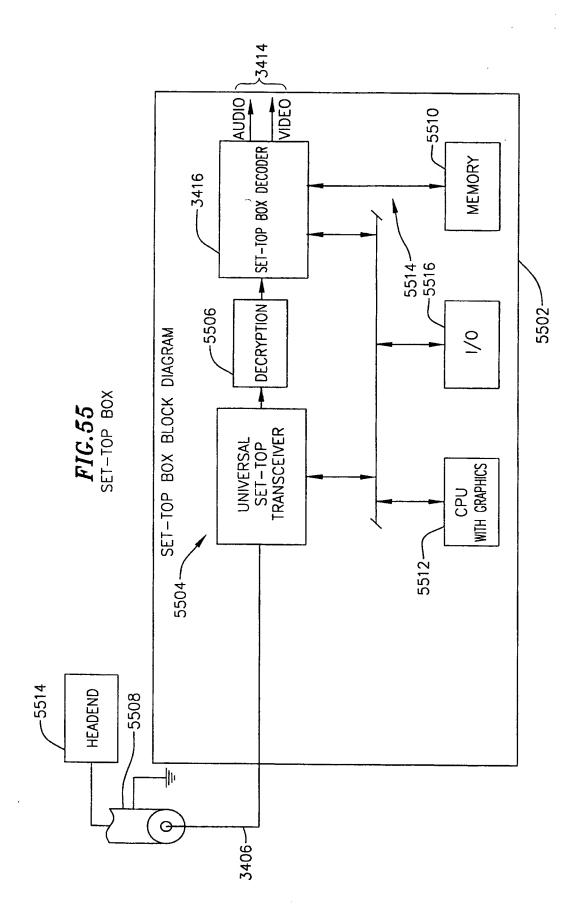


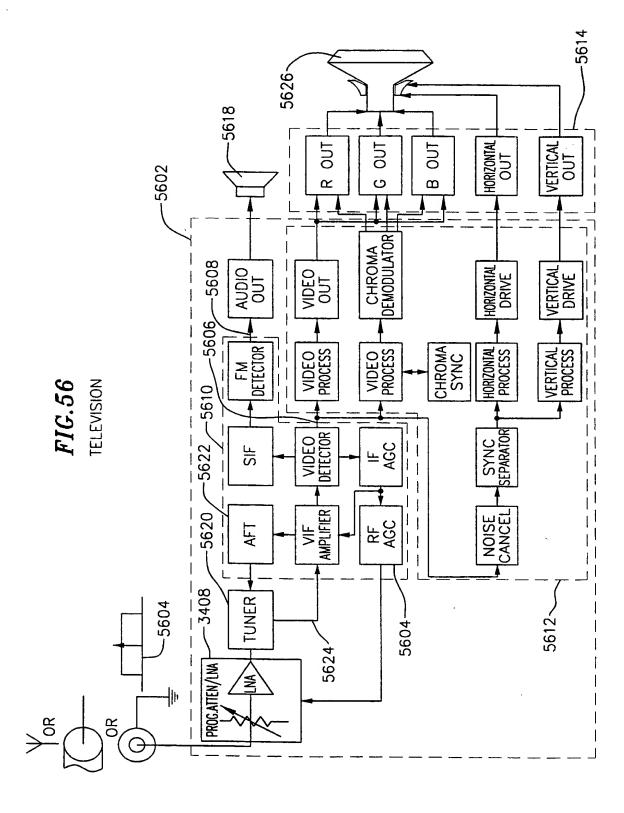
FIG.54











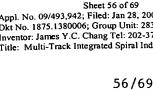
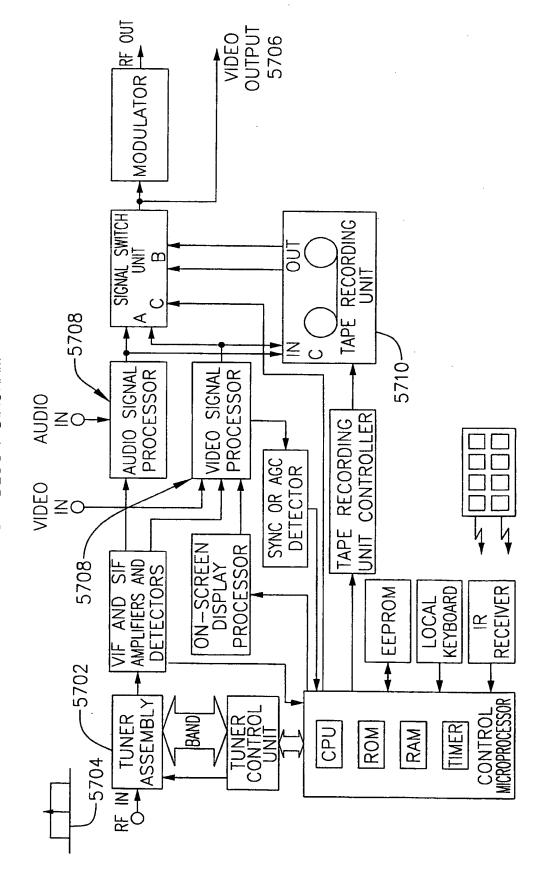


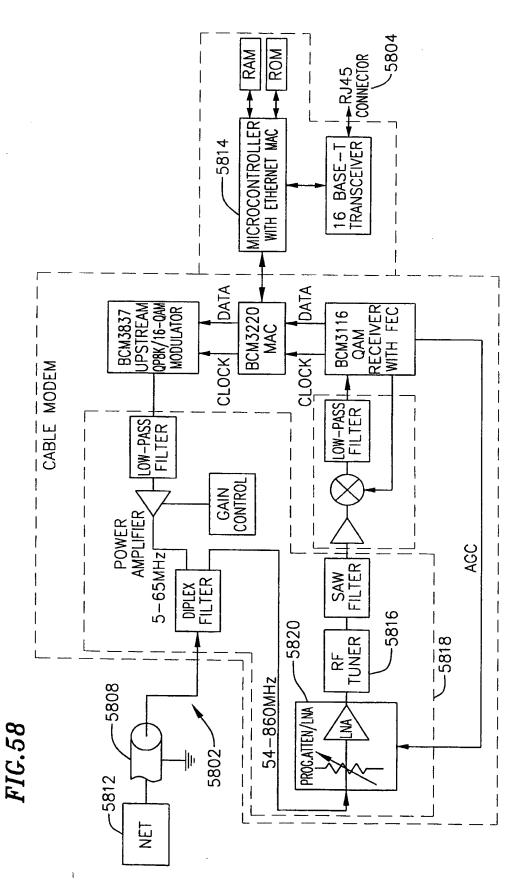


FIG.57VCR BLOCK DIAGRAM



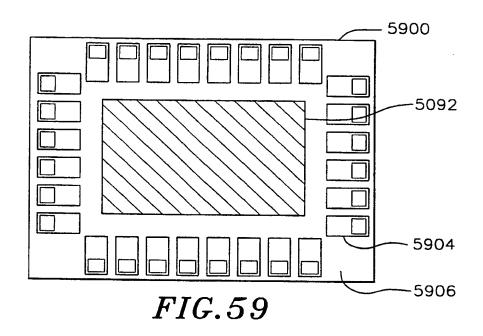








Sheet 58 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor



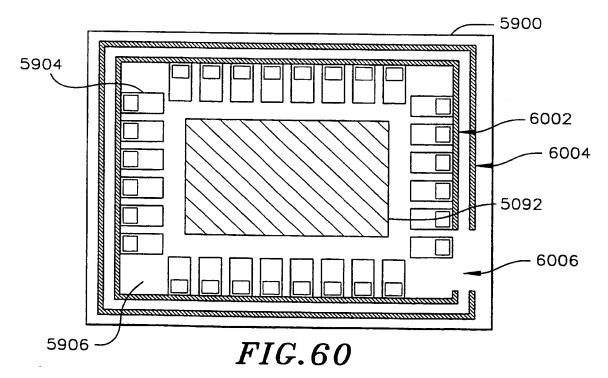






FIG. 61

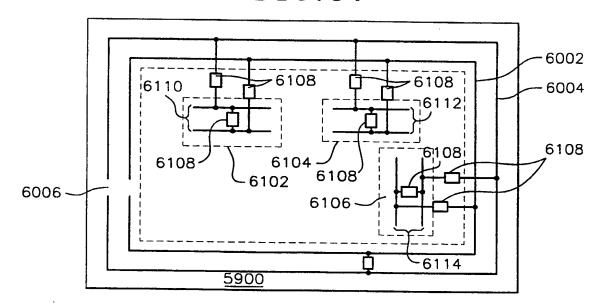
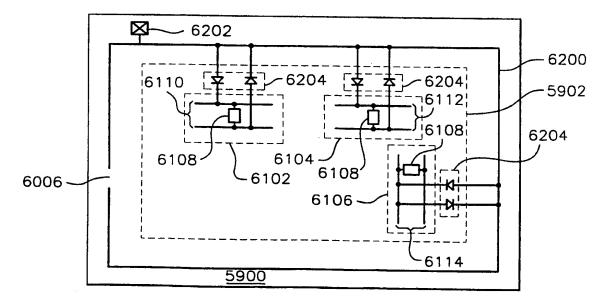
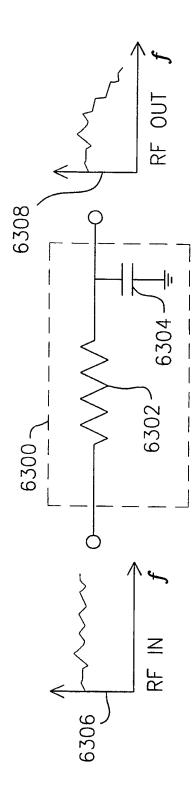


FIG. 62



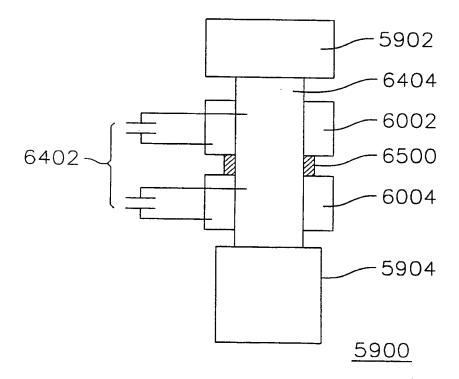
Sheet 60 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

60/69



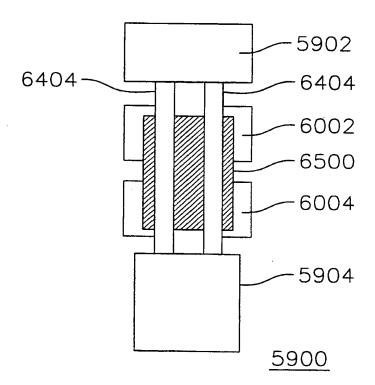


61/69



Sheet 62 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

62/69





Sheet 63 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

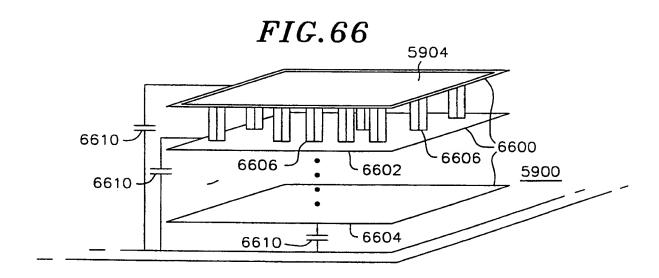
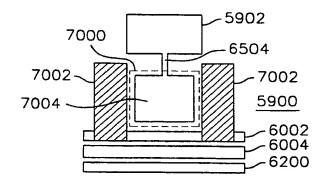


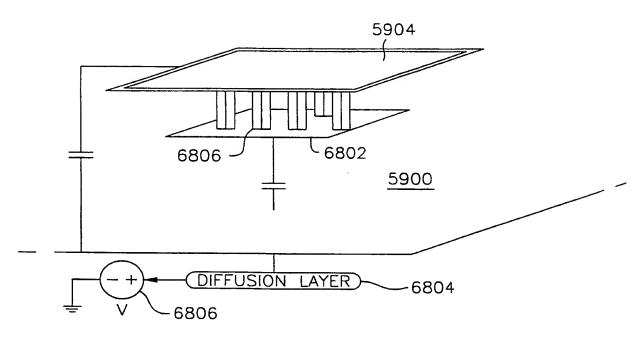
FIG.67





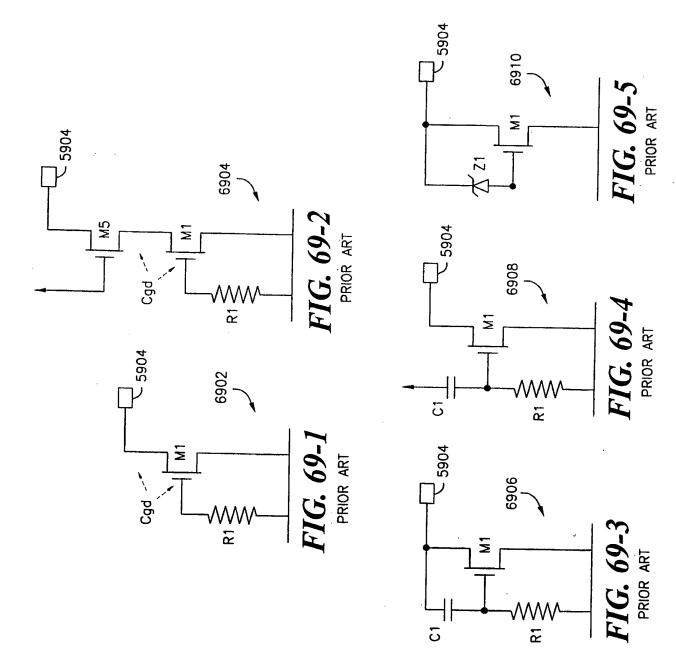
Sheet 64 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

FIG. 68





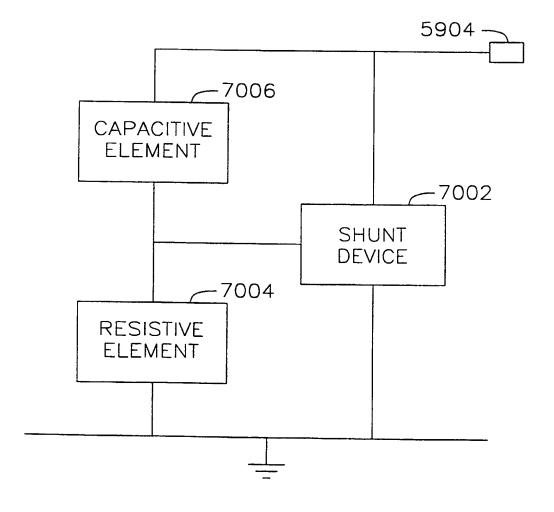






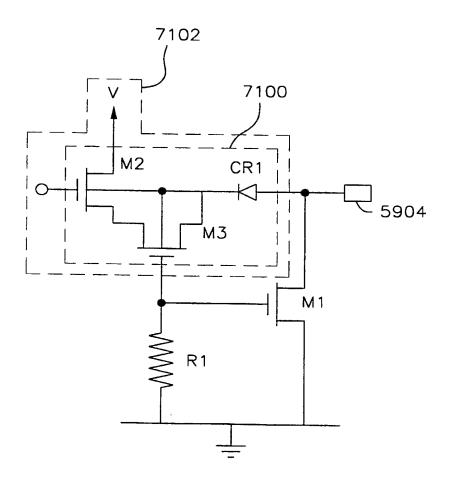
Sheet 66 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

66/69



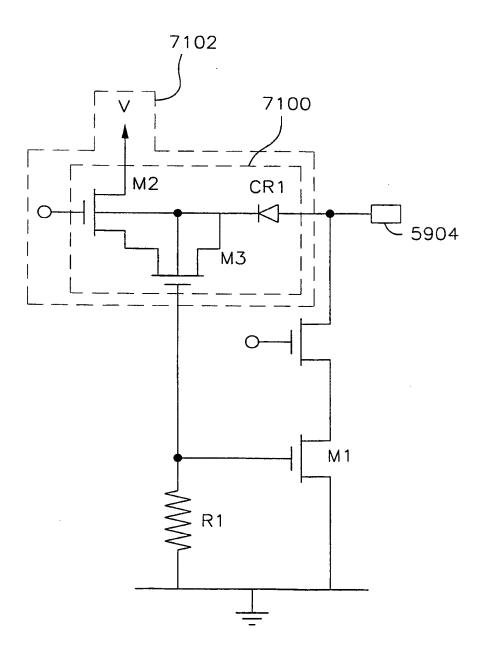
Sheet 67 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

67/69



Sheet 68 of 69 Appl. No. 09/493,942; Filed: Jan 28, 2000 Dkt No. 1875.1380006; Group Unit: 2832 Inventor: James Y.C. Chang Tel: 202-371-2600 Title: Multi-Track Integrated Spiral Inductor

68/69



Sheet 69 of 69
Appl. No. 09/493,942; Filed: Jan 28, 2000
Dkt No. 1875.1380006; Group Unit: 2832
Inventor: James Y.C. Chang Tel: 202-371-2600
Title: Multi-Track Integrated Spiral Inductor

69/69

